# An Empirical Study of the Recycling of Actuarial Gains and Losses : Evidence from Japan

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# An Empirical Study of the Recycling of Actuarial Gains and Losses: Evidence from Japan

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**Abstract**

This study examined the usefulness of recycling actuarial gains and losses from the viewpoint of persistence and value relevance. It found that, first, the persistence of net income will be higher if the recycling of actuarial gains and losses is prohibited, as was emphasized by the amendment of International Accounting Standard (IAS) No. 19 in 2011. Second, when such recycling is prohibited, the value relevance of the net income is higher, and it is possible to provide more useful accounting information than that derived from Accounting Standards Board of Japan (ASBJ)'s Accounting Standard No. 26.

**Keywords**: Actuarial Gains and Losses, Net Income, Conceptual Framework, Persistence, Value Relevance

## 1. Introduction

This study investigates the usefulness of recycling actuarial gains and losses. In recent years, the usefulness of net income and comprehensive income has become a topic of discussion. The scope of items reflected in the net income depends on whether to adopt recycling for other comprehensive income (OCI), which is the difference between comprehensive income and net income. OCI items that are recycled will eventually be reflected in the net income. On the other hand, OCI items that are not recycled are not reflected in the net income.

The breakdown and accounting process of actuarial gains and losses differ between the Accounting Standards Board of Japan (ASBJ) and the International Accounting Standards Board (IASB). According to ASBJ's Accounting Standard (simply "Accounting Standard" henceforth) No. 26, *Accounting Standard for Retirement Benefits*, actuarial gains and losses are the differences between the expected investment income of pension assets and actual investment results, and the differences arising from changes between the estimated and actual figures are used in actuarial calculations of the retirement benefit obligations (ASBJ 2012a, par. 11). In Accounting Standard No. 26, actuarial gains and losses are recognized as

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expenses based on the average remaining working hours (ASBJ 2012a, par. 24). In addition, unrecognized actuarial gains and losses are recorded in net assets in the form of OCI at the time of occurrence, and this portion is recycled from OCI to the net income when they are later cost-processed (ASBJ 2012a, pars. 15 and 24). According to Accounting Standard No. 26, actuarial gains and losses are ultimately reflected in the net income. On the other hand, the IASB (2011, par. 8) does not include the difference between the expected investment income of pension assets and the actual investment that results in actuarial gains and losses. According to IAS No. 19, *Employee Benefits* revised in 2011, it is affected by the revision of the method of calculating interest (IASB 2011, pars. BC74-81). However, among the differences in the income of pension assets, portions that are not included in the net interest are immediately recognized as OCI in full and as re-measurement items as well as actuarial gains and losses (IASB 2011, pars. 120 and 127). The IASB (2011, pars. BC70-71) pointed out the problem of deferred recognition and expressed the view that immediate recognition can provide financial statement users with superior accounting information in three ways: (a) relevance, (b) faithful representation, and (c) comparability. However, as the IASB (2011, par. BC90) considered the predictive value of the re-measurement items to be different from other components related to retirement benefits, the re-measurement items were reflected in the OCI. The IASB (2011, pars. 122 and BC99) also banned recycling on re-measurement retirement benefits because it did not provide consistent guidelines for recycling at the time. According to IAS No. 19, in 2011, re-measurement items such as actuarial gains and losses are not reflected in the net income at all.

In recent years, recycling discussions have been held actively in the IASB. The IASB (2015), further, presented certain directions for recycling in its Exposure Draft titled *Conceptual Framework for Financial Reporting*. The approach used by the IASB differs from that of the ASBJ. Net income is regarded as an important performance indicator in this Exposure Draft of 2015. Therefore, items reflected in the net income are also important. Is recycling of actuarial gains and losses really useful? This study examines this research question from the viewpoint of persistence and value relevance.

## 2. IASB's Discussions on Recycling

IASB (2013) published a discussion paper titled *A Review of the Conceptual Framework for Financial Reporting* and discussed recycling in it. I discuss IASB's (2013, par. 8.90) recycling approach in this discussion paper, which classified re-measurement items into the following three categories: bridging items, mismatched re-measurements, and transitory re-measurements[1], wherein the re-measurement items for retirement benefits are included in

1 Transitory re-measurements satisfy all three features: (a) Realization of assets or settlement of liabilities

transitory re-measurements. In addition, the IASB examined the pros and cons of recycling and the items to be included in the OCI for the 2013 discussion paper. They were divided into two parts: the prohibition and retention of recycling. The idea of recycling prohibition is that there should be a limit to each item's inclusion in the comprehensive income statement once (IASB 2013, par. 8.29). In this case, it is not necessary to specify the classification display of net income in the conceptual framework (IASB 2013, par. 8.27). Therefore, based on the recycling prohibition, it is believed that some firms do not display their net income. The reason for supporting recycling prohibition is that each item subject to recycling provides little useful accounting information about the current fiscal period (IASB 2013, par. 8.25). On the other hand, recycling retention is an idea that emphasizes the classification display of net income. Reasons for supporting the retention of recycling include protecting the integrity of net income as a primary source of information on a firm that has earned income on economic resources (IASB 2013, par. 8.24). Based on recycling retention, it is possible to identify whether each item is reflected in the net income or OCI.

The scope of OCI was examined for items to be included to retain recycling. The IASB proposed the following two approaches to consider the items to be included in the OCI: a narrow approach and a broad approach. The narrow approach includes items that are relevant for recycling to the net income in a later fiscal period (IASB 2013, par. 8.40)[2]. This approach includes bridging items and mismatched re-measurements in the OCI (IASB 2013, par. 8.54). Transitory re-measurements, which incorporate re-measurement retirement benefits, are reflected in the net income when they occur. On the other hand, the broad approach includes transitory re-measurements in the OCI (IASB 2013, pars. 8.88-8.90). Recycling with a broad approach is limited to the case where OCI items are relevant to reflect on net income (IASB 2013, pars. 8.81-8.84 and Flowchart 8.2). It has been pointed out that recycling OCI items, such as re-measurement retirement benefits, does not increase the predictive value of net income (IASB 2013, par. 8.85). Therefore, re-measurement items of retirement benefits are reflected in the OCI when they occur, but their recycling to the net income is prohibited. Thus, the accounting process for the re-measurement items of retirement benefits is different for both approaches.

The IASB (2015) presented a certain direction for the above two issues in its Exposure

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will be carried out over a long period of time. (b) Re-measurements of the current fiscal period are likely to reverse fully, or significantly change over the retention period of the assets or liabilities. (c) Recognition of the current fiscal period re-measurements fully or partly in the OCI enhances relevance and understandability of the net income as a key income indicator that firms have gained on economic resources (IASB 2013, par. 8.88).

2 Relevance is useful information required for the decision-making of financial statement users (IASB 2015, pars. 2.6-2.10).

Draft in 2015. It stipulated that the income and expenses reflected in net income were the primary sources of information on firms' financial performance for the current fiscal year (IASB 2015, par. 7.21). Display of the net income provides useful information to financial statement users to assess the prospects for future cash flows (IASB 2015, par. 7.20). Hence, the IASB (2015, par. 7.23) regards income and expenses reflected in the net income as important items. It is estimated that all income and expenses for the fiscal period will be reflected in the net income. OCI items are estimated to be recycled to the net income in the future, but if there is no clear basis for identifying the fiscal period in which recycling OCI items enhances the relevance of the net income, recycling is not performed (IASB 2015, pars. 7.26-7.27). Thus, the IASB supports recycling retention and the broad approach in the Exposure Draft of 2015; there is a limit on the OCI items recycled to the net income in a later fiscal period.

Both the IASB and ASBJ employ recycling, but the extent to which OCI items are recycled to the net income differs. The IASB does not recycle transitory re-measurements. Meanwhile, the ASBJ recycles all OCI items. The range of reflection on the net income varies, depending on the presence or absence of recycling. Actuarial gains and losses are included in the transitory re-measurements. This study examined the necessity of whether or not to recycle actuarial gains and losses to the net income.

## 3. Literature Review

Previous research on the value relevance of the actuarial gains and losses can be summarized in two points: (1) the sign of actuarial gains and losses is unstable, and (2) the presence or absence of value relevance for actuarial gains and losses are divided (Barth et al. 1992; Sasaki 2007; Takino 2007). As actuarial gains and losses are revisions of the estimated figures for retirement benefits, it is likely that the amount will fluctuate greatly with each fiscal period. This is because uniform evidence about the value relevance of the actuarial gains and losses is not presented.

Kagaya (2009) and Yan (2015) verified the persistence and value relevance of income based on the assumption that the IASB's accounting methods for the retirement benefits were adopted in Japan. Kagaya (2009) compared the net income calculated under the Japanese standard, prior to the introduction of Accounting Standard No. 26, with the net income calculated by the three accounting methods of the retirement benefits expenses, proposed in the IASB's 2008 discussion paper[3]. The results showed that the persistence and

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3 The proposed three accounting methods are as follows: (1) all the retirement benefits expenses are included in net income. (2) service costs (both costs arising during the current period and any past

value relevance of net income based on the Japanese standard, prior to the introduction of Accounting Standard No. 26, are the highest. However, three accounting methods for the calculation of retirement benefits expenses, proposed in IASB's 2008 discussion paper, do not include the same accounting methods as that in IAS No. 19 in 2011.

Yan (2015) compared the incomes calculated under IAS No. 19 in 2011 and under the Japanese standard prior to the introduction of Accounting Standard No. 26. The results revealed that income under IAS No. 19 in 2011 has more persistence and value relevance than income based on the Japanese standard prior to the introduction of Accounting Standard No. 26.

Thus, Kagaya (2009) and Yan (2015) utilized different accounting methods for retirement benefits for the IASB and the Japanese standard. In particular, Yan (2015) presented the possibility of higher persistence and value relevance of income by banning the recycling of retirement benefit items based on IAS No. 19 in 2011. However, previous studies verified that all accounting processes of the IASB's 2008 discussion paper and IAS No. 19 in 2011 were adopted in the Japanese standard. However, no verification focusing on actuarial gains and losses have been conducted. Actuarial gains and losses include estimate factors related to the future fiscal period for employees about to retire (IASB 2011, par. 108; ASBJ 2012b, pars. 22-28). In addition, re-measurement items including actuarial gains and losses are considered to have different predictive values compared to other components of the retirement benefits. Therefore, it is necessary to focus on actuarial gains and losses.

## 4. Hypothesis Development, Research Design, and Sample Selection

### 4.1 Hypothesis development

The IASB's discussion of recycling focused on the relevance of net income. The range reflected in the net income depends on whether to adopt the recycling of OCI items. The decision to recycle actuarial gains and losses varies between the ASBJ and IASB. IASB prohibits recycling because it believes that re-measurement items, including actuarial gains and losses, do not enhance the relevance of the net income[4]. In addition, it is necessary to

service costs) and changes in service costs caused by changes in assumptions other than the discount rate are included in net income, and the other components are included in OCI. (3) service costs (both costs arising during the current period and any past service costs), interest costs, expected investment income of pension assets and changes in service costs caused by changes in assumptions other than the discount rate are included in net income, and the other components are included in OCI (IASB 2008, pars. 3.10-3.16).

4 Recycling of actuarial gains and losses cannot be explained by the realization concept (Ozawa 2011; Tanaka 2011). According to Exposure Draft 2015, recycling is adopted when there is a clear basis for increasing the relevance of net income.

provide useful accounting information to financial statement users for their decision-making, in order to increase value relevance (IASB 2015, pars. 2.6-2.10; ASBJ 2006, Chapter 2, pars. 1-5). The ASBJ's (2006) conceptual framework assumes that investors are financial statement users. Investors' decisions are reflected in the stock prices. They expect an increase in a firm's market value if its income for the current fiscal period persists in the future fiscal period (Obinata 2013, p. 231), which, in turn, increases stock prices. Will actuarial gains and losses really help investors make decisions?

In previous studies, the signs of actuarial gains and losses were unstable, and no uniform evidence was provided for their value relevance. Actuarial gains and losses are revisions of the estimated figures for retirement benefits and may be reversed in full in future fiscal periods. In other words, actuarial gains and losses have low persistence. Therefore, it is assumed that actuarial gains and losses are not useful accounting information for the future cash flow evaluation of firms by investors. Hence, it is presumed that net income that prohibits the recycling of actuarial gains and losses has more persistence and value relevance than net income that recycles the actuarial gains and losses. To confirm this, we set the following hypotheses:

Hypothesis 1: Net income that prohibits recycling of actuarial gains and losses has more persistence than net income that recycles actuarial gains and losses.

Hypothesis 2: Net income that prohibits recycling of actuarial gains and losses has more value relevance than net income that recycles actuarial gains and losses.

### 4.2 Research design

#### 4.2.1 Persistence

The persistence of income is examined by the percentage of income a year ago, leading to income generation in the following year (Ali and Zarowin 1992, Hermann et al. 2000; Francis et al. 2004; Kagaya 2009; Wakabayashi 2009; Inoue 2010; Yan 2015). In this study, the following regression models were set based on the net income before excluding taxes.

$$NI(AGL:Japan)_{it+1} = \alpha_0 + \alpha_1 NI(AGL:Japan)_{it} + DYear_{it} + \varepsilon_{it} \quad (1\text{-}1)$$

$$NI(AGL:IASB)_{it+1} = \alpha_0 + \alpha_1 NI(AGL:IASB)_{it} + DYear_{it} + \varepsilon_{it} \quad (1\text{-}2)$$

$NI(AGL:Japan)_{it}$ : Net income before excluding taxes of firm $i$ in year $t$ (the accounting method of actuarial gains and losses is based on Accounting Standard No. 26)

$NI(AGL:IASB)_{it}$ : Net income before excluding taxes of firm $i$ in year $t$ (the accounting method of actuarial gains and losses is based on IAS No. 19 in 2011)

$DYear_{it}$ : Year Dummies of firm $i$ in year $t$

This study examined the hypotheses by standardizing the coefficients. Hypothesis 1 was tested by comparing the coefficients and t-values of $NI(AGL:Japan)_{it}$ and $NI(AGL:IASB)_{it}$ in

models (1-1) and (1-2), respectively. In addition, the paired t-test and the Wilcoxon signed rank test were used to verify the significance of their differences (Spatz 1997, pp. 307-332). Model (1-1) was based on Accounting Standard No. 26. $NI(AGL:Japan)_{it}$ was the net income before excluding taxes, to which actuarial gains and losses were recycled. On the other hand, model (1-2) was based on IAS No. 19 in 2011, which prohibits the recycling of actuarial gains and losses to the net income. Therefore, $NI(AGL:IASB)_{it}$ did not include any actuarial gains or losses. Fiscal year ($DYear_{it}$) was controlled. In examining the persistence of income, all variables except $DYear_{it}$, were deflated by the total assets at the beginning of the fiscal year.

### 4.2.2 Value relevance

Value relevance had been examined in relation to the stock prices and accounting figures. Both the balance sheet and income statement items had been confirmed to be value relevant (Barth et al. 1993, 1998; Ohlson 1995; Inoue 1998; Harris and Muller 1999; Goncharov and Hodgson 2011; Dong et al. 2014; Mechelli and Cimini 2014). Hence, these can provide useful accounting information for investor decision-making. Net assets and net income are key indicators that summarize the balance sheets and income statements, respectively (Barth et al. 1998). This provides the cue to set up regression models based on the net assets and net income to examine value relevance.

In addition, the IASB focused on the relevance of net income in the recycling discussion. The scope of net income varies depending on the accounting method used for actuarial gains and losses. Therefore, in this study, I examined whether the value relevance of net income differed when different accounting methods were used for actuarial gains and losses. I set two regression models following the work of Barth et al. (1998). In addition, for setting the regression model using the stock price level with the market value as the dependent variable, eliminating the influence of scale was necessary (Kothari and Zimmerman 1995; Ota 2003). In this study, all variables except $DNEG$ and $DYear_{it}$ were deflated by the market value at the beginning of the fiscal year.

$$MVE_{it} = \beta_0 + \beta_1 BV_{it} + \beta_2 NI(AGL:Japan)_{it} + \beta_3 DNEG \times NI(AGL:Japan)_{it} + DYear_{it} + \varepsilon_{it} \quad (2\text{-}1)$$

$$MVE_{it} = \beta_0 + \beta_1 BV_{it} + \beta_2 NI(AGL:IASB)_{it} + \beta_3 DNEG \times NI(AGL:IASB)_{it} + DYear_{it} + \varepsilon_{it} \quad (2\text{-}2)$$

$MVE_{it}$ : Market value of firm $i$ in year $t$

$BV_{it}$ : Net assets book value of firm $i$ in year $t$

$NI(AGL:Japan)_{it}$ : Net income before excluding taxes of firm $i$ in year $t$ (the accounting method of actuarial gains and losses is based on Accounting Standard No. 26)

$NI(AGL:IASB)_{it}$ : Net income before excluding taxes of firm $i$ in year $t$ (the accounting method of actuarial gains and losses are based on IAS No. 19 in 2011)

$DNEG$ : Dummy variable of net income before excluding taxes (1 for negative, and 0 otherwise)

$DYear_{it}$ : Year Dummies of firm $i$ in year $t$

Hypothesis 2 is tested to compare the coefficients and t-values of $NI(AGL:Japan)_{it}$ and $NI(AGL:IASB)_{it}$ in models (2-1) and (2-2), respectively. In addition, the paired t-test and Wilcoxon signed rank test were employed to verify the significance of their difference. $DNEG$ is a dummy variable for net income before excluding taxes. Hayn (1995) provided evidence that losses are not value relevant. Therefore, this study controlled the effect of losses. In addition, the fiscal year ($DYear_{it}$) was controlled.

Further, I compared models (2-1) and (2-2) by using the Akaike information criterion (AIC)[5]. Next, to determine whether the difference in the accounting processes of actuarial gains and losses had a difference in the explanatory power of all accounting information, the Vuong (1989) test was adopted.

### 4.3 Sample selection and descriptive statistics

In this study, data on consolidated financial statements and stock prices were obtained from the Nikkei NEEDS Financial Data and Stock Price CD-ROM (2019), respectively. Accounting Standard No. 26 was introduced since the fiscal period starting in April 2013. Hence, listed firms on the first section of the Tokyo Stock Exchange that applied the Japanese standards during the fiscal period of 2014-2018 were considered for this study. The fiscal year-end is limited to March. In addition, I obtained disclosure information on the actuarial gains and losses from public annual securities reports. The firm's annual securities report is, usually, released within three months after the closing date. Therefore, it was presumed that the investor's decision on the disclosure information was reflected on stock prices three months after the closing date. Therefore, I selected the closing price three months after the closing date[6]. In addition, the following sample was excluded: (1) firms that have not completed 12 fiscal months, (2) banks and insurance firms, (3) firms that did not set both discount rates and expected rate of return on investment, and (4) firms that did not have unrecognized actuarial gains and losses. While examining the persistence, I excluded firms that were unable to obtain net income before excluding taxes or total assets at the beginning of the fiscal year in the t+1 fiscal year. Moreover, while examining value

5 The model with the smaller AIC value is the better model (Akaike 1976).

6 The market value at the beginning of the fiscal year, which is a deflationary indicator, is calculated by the closing price three months after the closing date.

relevance, I excluded firms that were unable to obtain stock prices.

Furthermore, the bottom and top 0.1% of all variables except the control variables were deleted to remove the effect of outliers in examining value relevance. Finally, there were 3,872 samples for persistence and 4,751 for value relevance.

Table 1 shows the descriptive statistics for all samples, and Table 2 lists the correlation coefficients used in examining value relevance. From Table 1, the standard deviation (Std. Dev.) of each variable in the regression models was less than the mean. From Table 2, dependent variable $MVE_{it}$ and the explanatory variables were all positively correlated, with the p-value being significant at the 1% level.

**Table1. Descriptive statistics for all samples**

| Panel A: Persistence (N=3,872) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Range | Minimum | Q1 | Median | Q3 | Maximum |
| $TUO(AGL)_{it}$ | 0.009 | 0.012 | 0.143 | 0.000 | 0.002 | 0.005 | 0.011 | 0.143 |
| $NI(AGL:Japan)_{it}$ | 0.059 | 0.051 | 1.096 | -0.390 | 0.031 | 0.053 | 0.081 | 0.706 |
| $NI(AGL:IASB)_{it}$ | 0.060 | 0.051 | 1.094 | -0.388 | 0.032 | 0.054 | 0.083 | 0.706 |

All variables are deflated by the total assets at the beginning of the fiscal year.

| Panel B: Value Relevance (N=4,751) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mean | Std. Dev. | Range | Minimum | Q1 | Median | Q3 | Maximum |
| $MVE_{it}$ | 1.177 | 0.411 | 7.617 | 0.336 | 0.946 | 1.122 | 1.341 | 7.953 |
| $BV_{it}$ | 1.246 | 0.642 | 5.696 | 0.081 | 0.782 | 1.133 | 1.585 | 5.776 |
| $TUO(AGL)_{it}$ | 0.021 | 0.034 | 0.494 | 0.000 | 0.003 | 0.010 | 0.025 | 0.494 |
| $NI(AGL:Japan)_{it}$ | 0.117 | 0.100 | 2.179 | -0.793 | 0.074 | 0.111 | 0.155 | 1.386 |
| $NI(AGL:IASB)_{it}$ | 0.120 | 0.101 | 2.170 | -0.785 | 0.077 | 0.113 | 0.158 | 1.385 |

All variables are deflated by the market value at the beginning of the fiscal year.

**Table 2. Pearson and Spearman correlation coefficients (N=4,751)**

| | $MVE_{it}$ | $BV_{it}$ | $NI(AGL:Japan)_{it}$ | $NI(AGL:IASB)_{it}$ |
|---|---|---|---|---|
| $MVE_{it}$ | | 0.206*** | 0.336*** | 0.344*** |
| $BV_{it}$ | 0.209*** | | 0.372*** | 0.384*** |
| $NI(AGL:Japan)_{it}$ | 0.308*** | 0.275*** | | 0.994*** |
| $NI(AGL:IASB)_{it}$ | 0.315*** | 0.286*** | 0.998*** | |

The upper and lower diagonals show the Spearman and Pearson correlations, respectively.

# 5. Empirical Results

## 5.1 Persistence

### 5.1.1 Main results for persistence

Table 3 shows the regression results based on all samples. $NI(AGL:Japan)_{it}$ and $NI(AGL:IASB)_{it}$ in models (1-1) and (1-2), respectively, are positive and significant ($p<0.01$). The coefficient of $NI(AGL:IASB)_{it}$ is slightly higher (0.695, t-value=60.189) than that of $NI(AGL:Japan)_{it}$ (0.694, t-value=59.985). In the paired t-test, the t-value of -33.740 is significant ($p<0.01$), suggesting that the persistence of $NI(AGL:IASB)_{it}$ is different from that of $NI(AGL:Japan)_{it}$. In the Wilcoxon signed rank test, the z-value of -37.473 is also significant ($p<0.01$). These results show that net income that prohibits the recycling of actuarial gains and losses based on IAS No. 19 in 2011 has more persistence than net income that recycles them based on Accounting Standard No. 26. In other words, Hypothesis 1 is accepted.

**Table 3. Persistence regression results for all samples**

| | Expected Signs | Model (1-1) Coefficient (t-value) | Model (1-2) Coefficient (t-value) |
|---|---|---|---|
| $NI(AGL: Japan)_{it}$ | + | 0.694 (59.985)*** | |
| $NI(AGL: IASB)_{it}$ | + | | 0.695 (60.189)*** |
| $DYear_{it}$ | | included | included |
| $NI(AGL: Japan)_{it}$ *vs* $NI(AGL: IASB)_{it}$ | | | |
| paired t-test | | t-value=-33.740*** | |
| Wilcoxon signed rank test | | z-value=-37.473*** | |
| N | | 3,872 | |

*** : $p < 0.01$. ** : $0.01 < p < 0.05$. * : $0.05 < p < 0.1$.

### 5.1.2 Additional analysis of persistence

In this study, two additional analyses were performed to confirm the robustness of the results of all the samples on persistence.

First, I examined whether the persistence varied yearly, depending on whether the actuarial gains and losses were recycled. Table 4 shows the yearly regression results, which are consistent with the results based on all samples. In all years, the coefficient of $NI(AGL:IASB)_{it}$ is higher than that of $NI(AGL:Japan)_{it}$. The difference between both variables was confirmed using the paired t-test and Wilcoxon signed rank test. Hence, Hypothesis 1 was

**Table 4. Persistence regression results based on each year**

| | | 2014 | | 2015 | | 2016 | | 2017 | |
|---|---|---|---|---|---|---|---|---|---|
| | Expected Signs | Model(1-1) Coefficient (t-value) | Model(1-2) Coefficient (t-value) | Model(1-1) Coefficient (t-value) | Model(1-2) Coefficient (t-value) | Model(1-1) Coefficient (t-value) | Model(1-2) Coefficient (t-value) | Model(1-1) Coefficient (t-value) | Model(1-2) Coefficient (t-value) |
| $NI(AGL: Japan)_{it}$ | + | 0.622 | | 0.698 | | 0.676 | | 0.790 | |
| | | (24.893)*** | | (30.395)*** | | (28.440)*** | | (39.671)*** | |
| $NI(AGL: IASB)_{it}$ | + | | 0.623 | | 0.699 | | 0.677 | | 0.792 |
| | | | (24.987)*** | | (30.498)*** | | (28.554)*** | | (39.863)*** |
| $NI(AGL: Japan)_{it}$ *vs* $NI(AGL: IASB)_{it}$ | | | | | | | | | |
| paired t-test | | t-value=-20.648*** | | t-value=-15.997*** | | t-value=-9.975*** | | t-value=-20.670*** | |
| Wilcoxon signed rank test | | z-value=-21.569*** | | z-value=-17.364*** | | z-value=-12.643*** | | z-value=-22.374*** | |
| N | | 985 | | 973 | | 965 | | 949 | |

*** : $p < 0.01$. ** : $0.01 < p < 0.05$. * : $0.05 < p < 0.1$.

accepted in the additional yearly analyses.

Second, I examined the robustness of the top half of the samples based on the absolute value of the unrecognized actuarial gains and losses. The regression results of all the samples included samples with a small impact owing to the unrecognized actuarial gains and losses, as well as the large samples. The regression results were consistent with the results when all the samples were used. Therefore, Hypothesis 1 was accepted.

Thus, it can be concluded that the persistence of net income is higher when the recycling of actuarial gains and losses is prohibited based on IAS No. 19 in 2011[7].

### 5.2 Value relevance

#### 5.2.1 Main results for value relevance

Table 5 shows the regression results for all samples. Both $NI(AGL:Japan)_{it}$ and $NI(AGL: IASB)_{it}$ were positive and significant ($p<0.01$). This means that an increase in $NI(AGL: Japan)_{it}$ or $NI(AGL:IASB)_{it}$ leads to an increase in $MVE_{it}$. The coefficient of $NI(AGL:IASB)_{it}$ is higher (0.405, t-value=21.392) than that of $NI(AGL:Japan)_{it}$ (0.398, t-value=20.831). In the paired t-test, the t-value of -31.467 was significant ($p<0.01$), suggesting that the value relevance of $NI(AGL:IASB)_{it}$ is different from that of $NI(AGL:Japan)_{it}$. In the Wilcoxon signed rank test, the z-value of -41.157 was also significant ($p<0.01$). These results provide

7 I examined persistence again by deleting the bottom and top 0.1 % of the samples of all variables except the control variables, and it was consistent with the regression results as described in this study.

**Table 5. Value Relevance regression results for all samples**

| | Expected Signs | Model (2-1) Coefficient (t-value) | Model (2-2) Coefficient (t-value) |
|---|---|---|---|
| *Intercept* | + / - | | |
| | | (0.863) | (0.780) |
| $BV_{it}$ | + | 0.088 | 0.082 |
| | | (5.922)*** | (5.530)*** |
| $NI(AGL: Japan)_{it}$ | + | 0.398 | |
| | | (20.831)*** | |
| $DNEG \times NI(AGL: Japan)_{it}$ | - | -0.182 | |
| | | (-9.910)*** | |
| $NI(AGL: IASB)_{it}$ | + | | 0.405 |
| | | | (21.392)*** |
| $DNEG \times NI(AGL: IASB)_{it}$ | - | | -0.183 |
| | | | (-10.087)*** |
| $DYear_{it}$ | | included | included |
| $NI(AGL: Japan)_{it}$ *vs* $NI(AGL: IASB)_{it}$ | | | |
| paired t-test | | t-value = -31.467*** | |
| Wilcoxon signed rank test | | z-value = -41.157*** | |
| Adj.$R^2$ | | 0.129 | 0.133 |
| AIC | | 4397.443 | 4375.964 |
| Vuong test | | -4.139*** | |
| | | (Model (2-1) < Model (2-2)) | |
| N | | 4,751 | |

*** : $p < 0.01$. ** : $0.01 < p < 0.05$. * : $0.05 < p < 0.1$.

evidence that net income that prohibits recycling of actuarial gains and losses based on IAS No. 19 in 2011 is more value relevant than net income that recycles them based on Accounting Standard No. 26. In other words, Hypothesis 2 was accepted.

Comparing the explanatory power of all accounting information, the adjusted R-squared (Adj.$R^2$) of model (2-2) is higher than that of model (2-1). The AIC in model (2-2) is smaller and better than that in model (2-1). Furthermore, the Vuong test was -4.139 and significant ($p<0.01$). From these results, it can be concluded that it is possible to provide accounting information that is more useful for the investors' decision-making than that

provided by Accounting Standard No. 26, by prohibiting the recycling of the actuarial gains and losses as amended by the IAS No. 19 in 2011.

### 5.2.2 Additional analysis of value relevance

To confirm the robustness of the results of all the samples, I examined three additional analyses in this study.

First, I inspected the robustness of the top half of the samples based on the absolute value of the unrecognized actuarial gains and losses. If the estimated figures for retirement benefits are close to the actual results, the effect of actuarial gains and losses will decrease. From Panel B of Table 1, the absolute value of the unrecognized actuarial gains and losses [$TUO(AGL)_{it}$] for all samples is a minimum of 0.000, with a median of 0.010 and a maximum of 0.494. Therefore, all samples have a small impact on the unrecognized actuarial gains and losses. Table 6 shows the results with the top half of the samples based on their absolute values. The results are consistent with the results based on all the samples. As the coefficient of $NI(AGL:IASB)_{it}$ in model (2-2) is higher than that of $NI(AGL:Japan)_{it}$ in model (2-1), and their difference is confirmed by the paired t-test and the Wilcoxon signed rank test, Hypothesis 2 is also accepted in the additional analysis based on the top half of the samples, with large impacts of unrecognized actuarial gains and losses. In addition, the explanatory power of model (2-2) is higher than that of model (2-1). The Vuong test was -4.007 and significant ($p<0.01$); therefore, the difference between both the models was confirmed. In other words, even with the top half of the samples, with a large influence on unrecognized actuarial gains and losses, it is presumed that it is possible to provide accounting information that is more useful for investors' decision-making than Accounting Standard No. 26 by prohibiting the recycling of actuarial gains and losses.

Second, I set the following regression models and examined Hypothesis 2. Previous studies had pointed out that value relevance should also be examined in the return models (Kothari and Zimmerman 1995; Easton and Sommers 2003).

$$R_{it} = \beta_0 + \beta_1 NI(AGL:Japan)_{it} + \beta_2 DNEG \times NI(AGL:Japan)_{it} + DYear_{it} + \varepsilon_{it} \quad (2\text{-}3)$$

$$R_{it} = \beta_0 + \beta_1 NI(AGL:IASB)_{it} + \beta_2 DNEG \times NI(AGL:IASB)_{it} + DYear_{it} + \varepsilon_{it} \quad (2\text{-}4)$$

$R_{it}$ : Return of firm $i$ in year $t$[8]

All variables except $DNEG$ and $DYear_{it}$ were deflated by the market value at the beginning of the fiscal year. An additional examination of models (2-3) and (2-4) was performed on all samples, as well as on the top half of the samples, with a large influence on unrecognized actuarial gains and losses. Hypothesis 2 is also accepted in the second

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8 $R_{it}$ is calculated as follows: $R_{it}$ = (Stock price after 3 months from the closing date + Dividend - Stock price after 3 months from the beginning date) / Stock price after 3 months from the beginning date.

**Table 6. Value Relevance regression results based on samples with large impacts of unrecognized actuarial gains and losses**

| | Expected Signs | Model (2-1) Coefficient (t-value) | Model (2-2) Coefficient (t-value) |
|---|---|---|---|
| *Intercept* | + / - | | |
| | | (2.448)** | (2.372)** |
| $BV_{it}$ | + | 0.134 | 0.129 |
| | | (6.691)*** | (6.451)*** |
| $NI(AGL: Japan)_{it}$ | + | 0.450 | |
| | | (16.467)*** | |
| $DNEG \times NI(AGL: Japan)_{it}$ | - | -0.238 | |
| | | (-8.965)*** | |
| $NI(AGL: IASB)_{it}$ | + | | 0.458 |
| | | | (17.062)*** |
| $DNEG \times NI(AGL: IASB)_{it}$ | - | | -0.238 |
| | | | (-9.137)*** |
| $DYear_{it}$ | | included | included |
| $NI(AGL: Japan)_{it}$ vs $NI(AGL: IASB)_{it}$ | | | |
| paired t-test | | t-value=-28.562*** | |
| Wilcoxon signed rank test | | z-value=-31.484*** | |
| Adj.$R^2$ | | 0.164 | 0.170 |
| AIC | | 2504.350 | 2486.467 |
| Vuong test | | -4.007*** | |
| | | (Model (2-1) < Model (2-2)) | |
| N | | 2,375 | |

*** : p < 0.01. ** : 0.01 < p < 0.05. * : 0.05 < p < 0.1.

analysis. In addition, the explanatory power of model (2-4) based on IAS No. 19 in 2011 was higher than that of model (2-3) based on Accounting Standard No. 26, and the statistically significant difference between both models was confirmed by the Vuong test. Hence, results of the return models were also consistent with the results so far.

Third, from models (2-1) to (2-4), I changed the stock prices two months after the closing date. As net income is a recognized item, we can obtain its information from the brief announcements published within 45 days from the closing date. Therefore, to compare

the value relevance of the net income owing to the presence and absence of recycling actuarial gains and losses, it is also reasonable to analyze using the stock prices two months after the closing date. I carried out an additional analysis based on the top half of the samples, which experienced a large influence of unrecognized actuarial gains and losses, and thus Hypothesis 2 was accepted.

Thus, the robustness of the results for all samples was confirmed.

## 6. Summary and Conclusion

In this study, I examined the usefulness of recycling actuarial gains and losses from the viewpoint of persistence and value relevance. The ASBJ adopts recycling of actuarial gains and losses in Accounting Standard No. 26, and their deferred recognition in the net income. Meanwhile, the IASB prohibits the recycling of retirement benefits re-measurement items, including actuarial gains and losses, as amended in IAS No. 19 in 2011. Therefore, actuarial gains and losses are not reflected in the net income according to IAS No. 19 in 2011. In Exposure Draft 2015, the IASB defined the income and expenses reflected in the net income as the main sources of information on a firm's financial performance for the current fiscal year and emphasized it greatly.

According to the draft, the IASB decided to retain the recycling of OCI items, but kept an option to prohibit recycling if it impaired the relevance of the net income. Actuarial gains and losses may return to full in the future fiscal period and disappear; that is, they have low persistence. The ASBJ assumes that investors are financial statement users. Investors expect an increase in the firm's market value if its income for the current fiscal period persists in the future fiscal period. This expectation is reflected in the stock prices. Therefore, it is surmised that actuarial gains and losses with low persistence are not useful accounting information for future cash flow evaluation by investors. Accordingly, this study was conducted.

The contributions of this study can be summarized as follows:

First, the persistence of net income will be higher if recycling of actuarial gains and losses is prohibited, such as in IAS No. 19 in 2011.

Second, when recycling of actuarial gains and losses is prohibited, the value relevance of net income is higher, and it is possible to provide more useful accounting information to the investors than in Accounting Standard No. 26.

The results of this study suggest that it is logical to prohibit the recycling of OCI items that impair the relevance of net income, as some of these have low persistence. By prohibiting recycling such OCI items, it is possible to provide more useful accounting information to investors, which is crucial for development of the firm. Hence, it is necessary to consider the option of prohibiting the recycling of OCI items in the conceptual

framework and standards setting in the future. And, the limitation of this study is that income of regression models is based on only net income according to IASB's discussions on recycling, further study will be considered to be based on operating income or ordinary income.

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